Framing the case for oral care:
Translating research to policy with combined claims data set for return-on-investment (ROI) analyses in Maine

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American Public Health Association
Philadelphia, PA
November 8, 2009

APHA presentation

Abstract

The Maine Oral Return-on-investment (ROI) project develops and tests analytic tools and policy methods to advance adult access to oral health services as a means of reducing the overall cost of health care. We created a Maine-specific database linking dental and medical claims; engaged stakeholders to define key elements and assumptions in a consensus approach to estimating ROI; and demonstrated the method by using it to estimate impacts of oral health services in Maine for two groups: pregnant women and people with diabetes. The ROI estimates may be used to make the economic case for improved oral health services and inform and promote policy changes with both public and private insurers.

Objectives

This session uses economic analysis to translate research into policy terms. A tool to support oral health policy is created using ROI to frame research findings related to the impact of periodontal care on medical outcomes. The project builds buy-in among policy-makers by engaging them in definitions of populations, procedures and outcomes used in the analysis.

Maine-specific data consisting of combined dental and medical claims allow us to replicate other studies and adjust results to Maine's population. In addition to clinical investment and returns, social returns are estimated. Recent studies related to the impact of periodontal health and control of diabetes, birth outcomes, and other conditions mediated by inflammatory processes undergird the analysis. Controversy over the nature and strength of causality is expressed through sensitivity analysis and a range of possible values.

Methods

This project focuses on policy promotion. This section describes the methods used to build a framework for formulating and disseminating policy recommendations. Framing is a process of defining the context of a policy. This project seeks to reframe health insurance and health care to include oral health. To offer our policy recommendations in the most effective way, we translate our findings to the contexts where each stakeholder group applies health care policy.

- **Recruit and convene an advisory group** to both advise and disseminate findings. We built on an existing, committed group of stakeholders that had been working on dental access issues in Maine, expanded the group to include experts on specific clinical cross-overs to be examined (diabetes, pregnancy, CVD) and members from the public and private (business and insurance) policy constituencies we wanted to engage. Members from the state Medicaid agency and dental insurers helped us estimate the cost of the intervention and define who would receive the intervention. Oral health providers and consumers help refine and frame messages for different audiences. Two national researchers whose work we are using have joined the group telephonically.

- **Prioritize oral/medical connections to explore.** Priorities were set based on interest of members of the group, results of intervention studies, and availability of information needed to support Maine-specific studies. This led us to change directions. We had planned to start with a replication of studies of periodontal care and birth outcomes. At first, needed Maine Medicaid data were not available. While working on how to retrieve information on birth outcomes, the preliminary results of intervention trials of periodontal care and birth were released, with the flat conclusion that the trials showed NO improvement as a result of # visits during pregnancy. For that reason, we moved to the next priority, diabetes. We also contacted the author of the intervention study, Steven Offenbacher, to learn more details about the implication of the trial for our analysis. As a result of this consultation we decided that we would take a longer look back prior to pregnancy in comparing outcomes. With the committee's guidance, we started with analysis of diabetes/oral care link, and selected cardiovascular disease as a third area to study.

- **Define non-medical cost outcomes and impacts to measure.** The committee met to consider alternative impacts for the diabetes study. The group endorsed the diabetes association methodology for estimating non-medical impacts. They also pointed out that we should include the impact of improved oral health per se in our estimates.

- **Frame findings to support public and private policy development.** The study will be presented as an ROI template that adjusts for Maine's experience. The findings will be framed in different ways, with different related materials, for various audiences. The project initially focused on state policy-makers, particularly the Medicaid agency and legislators. After discussion we determined that providers and employers/purchasers could be just as influential in initiating recommended changes, and would also influence public policy. In-depth discussion with a diabetes educator also pointed us towards messaging for consumer.

Return on Investment. Return on Investment (ROI) frames the value of a health intervention as the ratio of expected benefits to costs, taking into account the timing of expected results. It is a useful way of describing expected impacts to public policymakers, particularly at a state level

where decision-making may be dominated by budgetary calculations. It is also a valuable way of presenting the case for interventions to businesses.

ROI challenges:

- The science behind estimated benefits may not support precise estimates
- Studies are based on a population that differs in important ways from the state.
- Intervention is not comparable or feasible
- In long-term projects, the cost of money (interest rate) may exceed the value of the intervention

ROI opportunities:

- Stimulate discussion of impacts of changes beyond medical outcomes
- A mechanism for head-to-head comparison of treatment vs. prevention
- Engages different stakeholders by presenting intervention as a business opportunity.

Maine Data, National Findings

Making the case with claims. A growing body of evidence links periodontal disease to systemic inflammation and to clinical conditions related to the systemic effect include diabetes, cardiovascular disease and preterm birth (Darre, Vergnes, Taylor, etc..). Most prospective studies have involved small groups, and generalizability and causality is uncertain. Recently, large retrospective studies of insurance claims measured the strength (although not the direction) of the association between periodontal care and specific outcomes. Several large intervention trials are now under way.

Coordinate with researchers. We use Maine's all-insurer data set, including both dental and medical insurers, to parallel the claims studies.. In conducting the study of diabetes, we have coordinated with George Taylor, who analyzed multiple years of claims data to track the relationship between diabetes and its complications and periodontal care. Maine is a very rural, very white state, with few large employers; our results will complement the Michigan data, which includes urban and minority populations in a region dominated by large employers.

Data elements, grouping and preparation

- **Type of plan.** Taylor (diabetes-BC/BS) and Alberts (pregnancy-Aetna) each used data from a single carrier. Maine's data set includes all carriers, with dental and medical claims matched at the person level. We will analyze the effect of type of plan and coverage.

- **Geographic data.** Many regions in Maine suffer from shortages of dental providers. We have linked claims with county-level geographic information (Census and Maine office of Rural Health) in order to control for factors such as income, rurality and dental access. Person-level data in claims: age, gender, sometimes family type, zip code.

- **Structure data extraction.** Working with On-Point Health Data to define data elements, we linked dental and medical records over three years for insured Mainers who had a diagnosis of diabetes in any of the three years. The data includes flags for each year to indicate claims related to diabetes and several major complications. In addition to overall expenditures and costs for ED, inpatient, outpatient and physician's office visits, disease-specific expenditures were summarized using the Episode Treatment Group (ETG)™ grouper.

- **Data sets we did not get.** Although we still hope to get these data, Medicaid claims have not yet been released. We are delaying analysis of the periodontal/pregnancy link until this data becomes available because roughly half of all births in Maine are covered under Medicaid (MaineCare) or SCHIP.

ROI Formula and Early Results

Return on Investment (ROI) of covering 4 periodontal visits for people at risk

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[((medical cost due to diabetes complications related to periodontal disease-related changes in glycemic control)* (persons with diabetes))+
((medical costs due to changed birth outcomes due to periodontal disease)* (pregnant women at risk)) +
(Net present value of developmental delays in LBW children)] +
(value of productivity due to changed presenteeism) …etc…..

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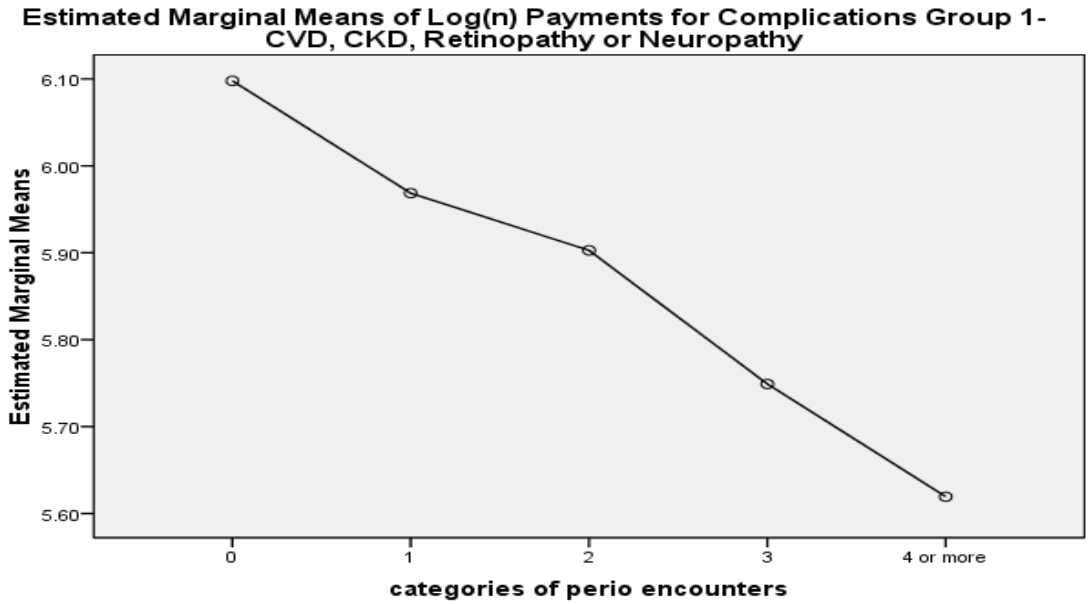
[(1.5% dental premium)*(insured group)]

We have just begun to explore the claims data set. A number of decisions remain to be made in regards to whether and how to truncate outliers, people with less than a full year of coverage, and which statistical approaches best fit the data based on its characteristics. A preliminary data run ANOVA for annual combined dental and medical claims from Maine between 2005-2007 for people with 12 months of dental coverage, controlling for gender and age, showed the following relationship between number of periodontal visits and payments for common complications of diabetes.



Conclusion: Framing ROI results for Stakeholders

The advisory group helps tailor findings for different key groups. Based on discussions and reading, we will produce policy briefs presenting the adjusted estimate of ROI, based on Maine data and national studies, for the following audiences as described below:

- **Oral health and medical providers:** Include overview of the scientific literature, the underlying clinical pathways, what clinical problems may be addressed, how to engage other members of a clinical team. This audience may also be interested in geographic variation in periodontal disease and clinical complications.

- **Buyers (public and private):** Focus on actuarial/net cost, including several different approaches to costs with differing implications. For carriers,dental and medical costs are separate. Purchasers of both dental and medical coverage are interested in how spending on one side can be offset by lower costs on the other. Net cost to public buyers includes long term costs as well, for example, in the case of pre-term births. In addition to impacts, buyers are interested in the intervention cost and time to pay-back.

- **Consumers:** Emphasize self-care, opportunities for avoiding pain and disability and prioritizing non-covered periodontal care against other personal needs. This brief will include information to be used to make the case for better coverage with employers.

- **Lawmakers**: Legislative or policy language, federal cost-sharing and state budgetary implications. In light of the severity of the current budget crisis and the recent failure of an expected cost-saving care management initiative to pay off, administrative mechanism to closely monitor costs and savings is desirable. This brief will include overall budgetary

impact, particularly short-term impacts, and timing of longer-term results. Lawmakers are also interested in macro economic impacts including effects on employability and student or worker productivity.

Policy changes:

- We have learned that one of the health insurers in Maine, Harvard Pilgrim, now offers a plan that includes coverage for 4 cleanings with a referral from the primary care provider. We will ask permission to present their policy as an example of an approach to assuring this care.
- Delta Dental, which provides this coverage, also has some purchasers who cover up to four visits. Both the plan that requires a physician's referral and the one that offers the richer benefit are priced at 1.5% above the standard plan.
- Both options increase dental premiums across the insured group by1.5% of the dental premium, an amount equivalent to about 0.15% of the total health premium.

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Acknowledgements
This research was generously funded by the Maine Health Access Foundation under its initiative, *Promoting Strategic Cost Containment Policies to Preserve and Expand Access.*

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